

such that the simplest method of operation for trains going to the inbound classification yard demands that they approach Mystic Junction over the Southern division route. The Portland west route freights were transferred over on to the Southern route by making use of a neglected three-mile branch, extending from Wilmington Junction to Wilmington.

The volume of traffic for this move, combined with the traffic on the Salem branch, made it advisable to place the tower in service again, with signaling and interlocking facilities for two new routes.

[The second part of this article explaining the important new interlockings and reconstruction in the Boston terminals will be published in the August issue.]

Signaling Half a Century Ago

*Report of Massachusetts Board of Railroad Commissioners in 1879
contains numerous references to contemporary
signaling development*

By J. M. Carley

Signal Estimator, Boston & Albany, Boston, Mass.

IN this age of rapid development of new ideas and consequent change in our point of view, we all have some feeling of pity, and possibly something of a "superiority complex" toward the ideas and inventions of the period just back of our immediate recollection and farther—but, we find by a little study, that the people in those days had their problems, and had to go through a process of personal development just the same as we do now. While we have progressed rapidly in the past few years, in those earlier years there were keen minded men thinking and studying, bringing out ingenious devices.

A particularly important comment by the Board of Railroad Commissioners of the Commonwealth of Massachusetts in 1879 was as follows:

"It is evident that the time has not come when the adoption of any one of the devices exhibited for giving automatic signals should be required by law. * * * Nor pending further experience on the part of railroad men, and further experiments by electricians and other inventors, can it be thought strange that railroad companies hesitate to equip their roads fully with imperfect devices, which may soon be set aside for better. * * * It is proper to add that our chief railroad companies have shown a praiseworthy spirit, both in testing new inventions and in adopting those, that, upon trial, have commended themselves to their judgment."

This seems to have something of a familiar sound and recalls the comments not long ago regarding train control.

The feeling of interest in block signaling, even as early as 1879, is indicated by the following from the Massachusetts "Resolves," 1879, Chapter No. 24:

"Resolved that the board of railroad commissioners be instructed to investigate the subject of railroad signals, and to report the result of their investigation to the several railroad corporations in this Commonwealth, and to the next General Court."

Block Signals Studied in 1879

In complying with these instructions the board held many hearings, examined many models, and inspected working signals on railroads in Massachusetts and other states. Their report is printed in the returns for 1879 dated January, 1880, and is both interesting and voluminous. After defining the "Block and Interlocking System" of signals the report says:

"The interlocking of switches and signals combined with the block system * * * not only secures each section from the entrance of a train while it is already occupied, but also blocks the section for any train while the track is broken by the throwing of a switch, or by the opening of a drawbridge, thus removing these causes of numerous disasters, while it allows a vast increase in the number of trains."

One of the definitions of the system is so well put that it seems well to mention it:

"The method, in brief, is by the use of levers operating switches and signals so interlocked that a signal of safety cannot be given while danger exists and danger cannot exist until after it has been signaled * * * the operator cannot, by negligence or forgetfulness, or even from malice, create a danger, or suffer it to exist, until he has signaled it, afar off, to any approaching train. He cannot open a switch before setting a signal at danger; having opened a switch he cannot leave a signal at safety; he cannot set the signal at safety before closing the switch; he cannot leave the switch half-closed, without giving a signal of danger. All these four errors, each of which has cost many lives, are made impossible in a section of road guarded by this system."

Smash Signal Defined

The "smash signal" now used by some roads, particularly at drawbridges, is mentioned as a contact bar, which "by striking the cab of the locomotive gives a warning somewhat like that of bridge guards which strike the person who is exposed on a freight car." It is again referred to as "a heavy plank, placed 2,000 ft. from the draw and so arranged that it falls by gravity when the draw is opened; and if the engineman still presses on, his locomotive is sure to lose its smokestack." How this is restored to a clear position is not explained.

By a comprehensive description of the combination of the interlocking device and the block system the report describes quite accurately what we can recognize as the controlled-manual system. This is summarized by saying:

"The signal which permits entrance into a section cannot be given without the concurrence of signalmen at both ends of the section. The starting signal is reset at danger by machinery behind every train. The signal that the line is blocked must be given from the station in advance to the station in the rear."

This is followed by the statement that the above is "borrowed from a description of a combination of the Toucy & Buchanan with the Saxby & Farmer devices, which, aided by some subsidiary inventions, are now in use on a portion of the Pennsylvania, and on the Metropolitan Elevated railroad as well as elsewhere." A reference is made to the "ingenious device of David Rousseau, involving the same principles, and accomplishing the same end," which, it says, "may be seen at the New York Grand Central depot."

An important reason for the development of the automatic signal system was said to be due to the fact that the block system, so called, "required a

*Italics ours.

